(1) inverting the semantic relation structure; and

(2) storing, in association with the value, the inverted semantic relation structure.

44.   The system of claim 43 in which:

the value of the extracted semantic relation structure includes a primary value term, a lower level relation, and a lower level value term; and

the means for augmenting includes means for storing in association with the primary value term the inverted semantic relation structure, said stored inverted semantic relation structure including the lower level relation and the lower level value term.

45.   The apparatus of claim 43 in which the parsing means is a broad coverage parser.

REMARKS

After entry of the foregoing amendment, claims 16-45 are pending in the application.

Amendments to Specification

Newly added to page 30 of the specification is Figure 8 and associated text. These inserts serve simply to review contents

of a personal computer (such as the 66 MHz Intel PC referenced at page 30, line 4) that are well known to artisans in the field. No new matter is thereby added. Apt to this amendment are the remarks of Judge Rich in a similar fact situation:

> We feel that the amendments to the specification merely render explicit what had been implicitly disclosed originally, and, while new <u>language</u> has certainly been added, we are not prone to view all new "language" ipso facto as "new matter."

<u>In re Wright</u>, 145 USPQ 182, 188 (CCPA 1965). Likewise, in the present application, new language is added; not new matter.

Applicants stand ready to submit advertising and product reviews from widely circulated industry publications, such as PC Magazine, establishing that the elements recited in the inserted text were known to be components of personal computers by artisans at the time the application was filed, if there is any doubt on this point.

Title

The title was objected to as not clearly indicating the invention to which the claims are directed. Applicants presume this was due to the recitation of a "system" when no apparatus claims were filed.

By the foregoing amendment, claims directed both to methods and systems are included, so the original title is now believed to be appropriate. If the Office has in mind another title that

might be more descriptive of the claimed invention, kindly so advise.

Section 101

Applicants believe the claims as originally filed defined statutory subject matter. Nonetheless, to expedite prosecution, applicants have submitted new claims that include affirmative machine recitations, obviating any "mental process" contention. The particular form of the amended claims was modelled after claims issued in U.S. Patent 5,056,021 cited by the Office ("Method and Apparatus for Abstracting Concepts From Natural Language").

Section 112

The new claims have been drafted to address the Section 112 concerns raised by the Office in Paper 4.

Regarding the issue raised in connection with claims 4 and 12, the claims stated that the second set of semantic relations is different than the first. Construed with reference to the specification (e.g., sentence bridging pp. 9-10, and discussion of "Second and Subsequent Passes" beginning at page 19, line 22), the language of claims 4 and 12 is believed to be sufficiently definite. Similar language is included in new claims 27 and 38.

Regarding original claim 14, this claim is cast in Jepson form, with the steps known from the prior art in the preamble, and the improvement in the body of the claim. In interpreting such claims, the steps recited in the preamble form part of the patented combination. So interpreted, the claim is not a single step claim. Nor is new claim 41.

Some of the new dependent claims reference "broad coverage" parsers. This is a term understood by those skilled in the art. (See, e.g., page 3, lines 15-20.)

Some of the new claims also address complex relations (e.g. where a value of a semantic relation is, itself, a semantic relation). This aspect of the invention is discussed, e.g., at pages 17-19 (e.g. **corolla** *purpose* attract *typical object* insect).

Some of the new dependent claims refer to sense numbers used to identify particular ones of a plurality of definitions associated with a particular term in an on-line dictionary. Support for this limitation is found, e.g., at page 18, line 6 of the specification.

Remarks on Prior Art

Inversion of semantic relations was acknowledged in the specification to be old. Applicants' claims define combinations that include this operation; no claim thereto, *per se*, is made.

Applicants respectfully submit that Paper 4 failed to make
out a prima facie case of obviousness as to any claim. While
alleging the presence of each element in the prior art, the
Action failed to cite a suggestion in the cited art leading to
each of the combinations claimed. The only rationale cited for
the proposed combinations are the advantages thereby afforded.
But this is not sufficient. Citation of an invention's
advantages as grounds for obviousness is a bootstrap premised on
hindsight.

Further, the art cited affirmatively teaches away from the
combinations claimed. An artisan reading Lenat would be led
away, not towards, automated generation of a knowledge base from
a textual reference source.

The Cyc Project which is the subject of the Lenat reference
is a large knowledge base into which millions of entries were to
be hand-coded. *The investigators considered, and discarded, an*
automated approach:

> **Hard Work (No Free Lunch)** The limited success we had
> with automatic program synthesis from examples and
> dialogues in the early seventies led us to the AM
> research (automated discovery of domain concepts).
> It limited success led us to Eurisko, which tried to
> discover new heuristics as it went along. *Its*
> limited success led us to believe that there is no
> free lunch; that is, that we had to apply the tactic
> of last resort - hard work - and thus Cyc was born.
> We are building the needed [knowledge base] manually,
> one piece at a time, at least up to the crossover
> point where natural language understanding begins to
> be a more effective was of further enlarging it.

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Lenat at page 26. See also page 21.

Lenat also disparaged encyclopedias as knowledge bases.

See page 23.

Applicants adopted a contrary approach -- that of compiling

a rich knowledge base from scratch, automatically. Indeed, the

first paragraph in the Background discussion of applicant's

specification distinguished hand-coded systems such as Lenat:

> Most semantic knowledge which is required in Natural
> Language Processing (NLP) or, e.g., in Artificial
> Intelligence (AI), has had to be built by hand, or
> hand-coded. Because the task of hand-coding semantic
> knowledge is time-consuming, these applications have
> necessarily been limited to a specific domain. In
> order to achieve true broad-coverage NLP, i.e., NLP
> unrestricted in domain, detailed semantic knowledge
> is required for tens, and hundreds, of thousands of
> words, including those which are infrequent,
> technical, informal, slang, etc. Constructing such
> semantic knowledge by hand as required in NLP, and
> possibly AI, is a significant problem. The problem
> is: how to acquire the semantic knowledge required
> for an unrestricted domain.

Applicants' invention solved this long-standing problem and

finally made possible the automatic acquisition of "common sense"

knowledge from readily available on-line sources. Rather than

rendering obvious applicants' invention, Lenat is simply an

example of the extensive unsatisfactory prior art that -- for

years -- has been unable to meet this critical need.

Notwithstanding the foregoing issues, applicants have

amended their claims to further distinguish the prior art. Claim

16, for example, now recites that the semantic relation structure

is "complex."   This emphasizes the difference between applicants'
inversion of a semantic relation *structure* and Lenat's simple
inversion of a semantic relation.

Claim 16 further details an aspect of this complexity,
namely that the "value" of the semantic relation structure
includes a primary value term, a lower level relation, and a
lower level value term.   (This particular form of complexity is
known as a "nested" relation structure.)

Claim 16 further details that the inverted complex semantic
relation structure includes the lower level relation and the
lower level value term.

None of the these elements is taught or suggested by Lenat.

Likewise, claim 17 specifies that the machine-implemented
parser analyzes for at least 8 of an enumerated set of semantic
relations.   The claimed listing of relations have found by the
inventors to be an optimal selection, balancing processing speed
with knowledge thereby acquired.   (*See In re Rijckaert*, 28 PQ2d
1955, 1957 (Fed. Cir. 1993) for the Federal Circuit's recent
approval of optimizations as patentable improvements.)

Likewise, claim 18 adds elements not contemplated by the
cited art, such as the machine analysis of a text corpus to
identify a set of segments therein; the automatic discernment
from these text segments of a first set of complex semantic
relation structures; the inversion of these complex structures;

and the addition of the inverted complex structures to the
knowledge base in association with the corresponding values.

Each of applicants' claims likewise defines a combination
which is neither taught nor suggested by the prior art, and which
overcomes longstanding barriers[1] to cybernetic acquisition of
"common sense" knowledge about the world.

Respectfully submitted,

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[1] *See, e.g.*, Mortimer Taub's classic *Computers & Common
Sense: The Myth of Thinking Machines*, first published in 1961 and
still in print 30 years later.

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